European Scientific Journal May 2020 edition Vol.16, No.13 ISSN: 1857-7881 (Print) e - ISSN 1857-7431

Entrepreneurial Orientation and Firm Innovativeness in Manufacturing Small and Medium Enterprises: The Moderating Effect of Environmental Dynamism

Benedict Wandera Mkalama,
Elijah Bitange Ndemo,
Jackson Kivui Maalu,
Ganesh P. Pokhariyal,
University of Nairobi, Kenya

Doi:10.19044/esj.2020.v16n13p199 URL:http://dx.doi.org/10.19044/esj.2020.v16n13p199

Abstract

In spite of firm innovativeness being identified as essential for firm performance and growth, there exists a dearth of studies that relate entrepreneurial orientation and firm innovativeness in manufacturing small and medium enterprises in Kenya. A cross sectional survey approach was adopted to study this effect. Environmental dynamism as a moderating variable was identified as affecting the relationship between entrepreneurial orientation and firm innovativeness in this model. The unit of analysis was the manufacturing small and medium enterprise firm within Nairobi County, Kenya. Stratified Random Sampling was applied to obtain 363 samples, followed by a series of descriptive and inferential analysis on the collected data. Entrepreneurial orientation was confirmed as having a significant effect on firm innovativeness. It was further confirmed that environmental dynamism had a moderating effect on the relationship between entrepreneurial orientation and firm innovativeness. The study recommends further studies for the construct of innovativeness in small and medium enterprises. It further recommends that active decision-making on the basis of internal and external circumstances are very important for a firm to be innovative. The study also recommends a raft of policy considerations that seek to address the diffusion of innovation across various enterprises segments.

Keywords: Entrepreneurial orientation, Environmental dynamism, Firm Innovativeness, Small and Medium Enterprises, Manufacturing, Open Innovation

Introduction

Previous studies have indicated that firm innovativeness contribute towards firm performance and growth of small and medium enterprises (SMEs) (Miller, 1983; Covin & Slevin, 1989; Kuratko, Ireland, & Hornsby, 2001; Ngugi, Mcorege, & Muiru, 2013). Innovation is driven by the entrepreneurial actions of firm owners (Miller, 1983; Covin & Slevin, 1989). In as much as entrepreneurial orientation has been identified to contribute significantly to firm innovativeness, it is similarly important to conceptualise other factors that affect this relationship. This is a significant research area and for which it has been identified that there has not been adequate conceptualisation (Gilbert, 2007; Ucbasaran, Westhead, Wright, & Flores, 2009; Ejdys, 2016; Wales, 2016; Pustovrh, Jaklic, Martin, & Raskovic, 2017; Mkalama, Ndemo, & Maalu, 2018).

Studies have linked the development of global economies to the advancement of the SME sector which on average account for between 3%-50% of the gross national products for the developing world (Ayyagan, Beck, & Demirgue-Kunt, 2007; Ardic, Mylenko, & Saltane, 2011; KNBS, 2016; Muriithi, 2017). Despite contributing significantly to the Kenyan economy, manufacturing SMEs have been linked to little automation estimated at 32% within the segment and low value addition and resultant low productivity (GOK, 2013; KNBS, 2016; KAM, 2019; Ndemo & Mkalama, 2019). A general area of concern is how to increase the level of innovation within the SMEs in Kenya and secondly how to automate further so as to increase efficiencies. It is therefore important to try and understand why SMEs, do not develop their innovativeness to much higher levels.

External factors from both formal and informal institutions in which the Kenyan SMEs interacted with, played a significant role in the innovativeness of SMEs (Voeten, 2015). In as much as there has been concerted effort in the development and review of supportive government policies, the impact has not been felt and the general feeling is that the government practise is bureaucratic and restrictive in nature (Voeten, 2015; Ndemo & Mkalama, 2019). Due to the non-effectiveness of government policies, there are recurring themes that question the causes of innovativeness within SMEs and more so, the firm level and ex-firm level interactions that contribute to innovativeness.

Numerous researches have studied the relationship between entrepreneurial orientation and other outcomes (George and Marino, 2011; Wach, 2015; Wales, 2016) but they neither describe the antecedents of innovation nor do they explore the relationship with historical innovation on itself (Mkalama et al., 2018). Most of the studies have tended to focus on performance as the dependent variable whereas there are emerging studies that suggest that there are other areas that may not have been exhaustively studied

(Wales, 2016). Innovativeness remains under-conceptualised (Perez-Luno et al., 2010). There is therefore a compelling reason to disaggregate the relationship between entrepreneurial orientation and performance and instead study the antecedents of innovativeness. Resultantly this approach also reviews the relationship between entrepreneurial orientation and environment dynamism and their effect on innovativeness.

Literature Review

Entrepreneurial Orientation

The concept of entrepreneurial orientation was advanced from the pioneering work of Mintzberg and buffeted as a concept by Miller (1983). It has been conceptualised as that underlying disposition of a firm that has the capability to rejuvenate the firm in a way that it can be able to withstand existing or latent events. This behaviour could result in an entity outperforming their competitors (Avlonitis & Salavou, 2007; Covin & Lumpkin, 2011; Wales, 2016; Mkalama et al., 2018). Entrepreneurial orientation is a multidimensional construct that is commonly dimensionalised of pro-activeness, innovativeness, risk taking (Miller, 1983; Covin & Slewin, 1989), competitive aggressiveness and autonomy (Lumpkin & Dess, 1996; George & Marino, 2011).

Empirical studies showed that these dimensions had significant influences across different sizes and complexities of firms (Miller, 1983). The influence of these dimensions differs with internal factors to external factors (Lumpkin & Dess, 1996; Miller, 2011). Many fast growing and successful corporations attribute much of their success to entrepreneurial orientation (Dess, 2005; Wiklund and Shepherd, 2005), which has been accepted as a firm level phenomenon (Wach, 2015). Unfortunately, over time the definition of this construct, its components, the relationship between and amongst the components as well as the theory around it have not been consistent (George & Marino, 2011; Covin & Wales, 2012). Notwithstanding this and the fact that this field has attracted numerous studies, there is a general lack of consensus on the precise definition of entrepreneurial orientation and the subsequent dependent variable indicators (Fatoki, 2012; Rauch et al., 2009; Miller, 2011). The most commonly used measure for the dimensions of entrepreneurial orientation is the Miller, Covin and Slewin (1989) Entrepreneurial Orientation Scale (Lumpkin & Dess, 1996; Lumpkin, Cogliser, & Schneider, 2009).

Empirical studies albeit with limited consensus have shown entrepreneurial orientation to be a prerequisite for innovativeness (Hult, Hurley, & Knight, 2004; Renko et al., 2009; Perez-Luno, et al., 2010; Laforet, 2011; George & Marino, 2011; Ruiz-Ortega et al., 2013; Wales, 2016; Ejdys, 2016). There were however, some variations on the effect across the various dimensions of entrepreneurial orientation. Avlonitis & Salavou, 2007

established that pro-activeness rather than risk taking had a significant relationship with innovativeness. Perez-Luno et al., 2010 subsequently established that pro-activeness and risk taking as dimensions of entrepreneurial orientation affected innovativeness. The effect of risk taking on innovativeness was however found to be inconclusive in other studies such as Rigtering (2013). Joshi, Das, & Mouri (2015) investigating the role of pro-activeness and risk taking in technology-based industries in United States of America and concluded that both have a significant relationship with innovativeness. Joshi et al., 2015 also established that whereas pro-activeness has an inverted U-shaped curvilinear relationship, risk taking had a positive linear relationship with innovativeness. Ejdys (2016) confirmed that pro-activeness affected innovativeness. Even though the study, confirmed that risk taking affected pro-activeness, it was unable to confirm that risk taking as a dimension affected innovativeness. Gudda (2017) established that pro-activeness and risk taking dimensions affected SMEs product innovativeness further confirming the results of previous studies.

In spite of these developments, there are still divergent opinions on the effect and a need for further studies to validate these arguments across various geographies and industries.

Environmental Dynamism

Environmental dynamism is one of the three dimensions of Environmental Turbulence (Volberda & van Bruggen, 1997). The discourse on the dimensions of environmental turbulence concept indicates a simultaneous effect of change, uncertainty and a level of unexpected directionality of occurrences. The three dimensions of turbulence are environmental dynamism, environmental complexity and environmental predictability which is also known as environmental munificence. The three dimensions have been further split further into two sub dimensions.

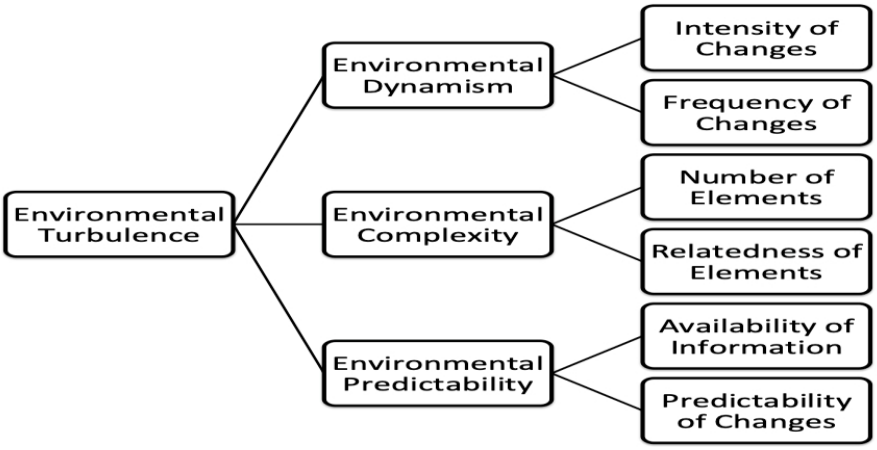

Figure 1: Volberda & Van Bruggen (1997) Dimension of Environmental Turbulence

Environmental dynamism is explained as the variation of the external environments under which firms operate (Volberda & van Bruggen, 1997; Wijbenga & van Witteloostuijn, 2007; Jansen, Vera, & Crossan, 2009). Environmental dynamism may be either static or dynamic depending on the attributes being considered. It can be further defined by either its intensity (impact) of change or frequency (rate) of the change (Volberda & van Bruggen, 1997). However, empirical research has not been conclusive in managing to delineate the difference between the intensity and the frequency of change resulting in many scholars treating the two as the same (Al-Nuiami, Idris, AL-Feroukh, & Joma, 2014).

Environmental dynamism influences the external circumstances under which a firm operates and these may change from time to time and are likely to have an impact on both the internal and external practices of the firm (Miles, Covin, & Heeley, 2000; Ruiz-Ortega, Parra-Requena, Rodrigo-Alarcon, & Garcia-Villaverde, 2013). Environmental dynamism causes firm owners to encounter uncertainties in management leading to a series of responses that may include seeking more comprehensive information (Dess & Beard, 1984). In addition, environmental dynamism forces firms to be innovative in their products and approach to markets (Zhou, 2006) and may also result in active changes to consumer tastes and preferences (Wijbenga & van Witteloostuijn, 2007). An external environment that is highly dynamic requires firms to have a capacity to adjust accordingly so as to effectively react to variations in customer needs, technological changes as well as respond to competition (Jiao, Alon, Kwong, & Chui, 2013).

Environmental dynamism can be measured as a uni-dimensional measure and the most commonly used measure is the multi-item scale of Miller (Miller & Friesian, 1983; Miller, 1987; Miller and Droge, 1986; Garg, Walters, & Priem, 2003). Other studies have shown environmental dynamism

to have a moderating effect on the relationship between entrepreneurial orientation and innovativeness (Peres-Luno et al., 2010). Other studies on SMEs showed that innovativeness was affected by environmental dynamism (Khan & Manopichetwattana,1989; Chang et. al. 2011; Okeyo, 2014; Musawa & Ahmad, 2018). On the basis of a study in Netherlands, Kraus, Coen Rigtering, Hughes, & Hosman (2012) argued that whereas pro-activeness and innovativeness firm behaviour positively affect SME performance during the dynamic times, innovative SMEs performed better in turbulent environments with the caveat that these innovative SMEs however needed to minimize measured risk. Moreover, the authors opined that there were few studies that examined the firm capabilities and conditions necessary for extreme environmental and market turbulence.

Ruiz-Ortega et al., (2013) demonstrated that environmental dynamism significantly affected entrepreneurial orientation. Staniewski, Nowacki, & Awruk (2016) confirmed that there was a significant relationship between what happened in the external environment of the firm and the final outcome of its innovativeness. Zhai, Sun, Tsai, Wang, Zhao, & Chen (2018) examined a model on the effects of entrepreneurial orientation, absorptive capacity, and environmental dynamism on technological innovation performance in SMEs and concluded that environmental dynamism moderated the relationship between absorptive capacity and entrepreneurial orientation and innovation performance.

Firm Innovativeness

There is no convergence on knowledge on the source of innovation in firms with views ranging from conscious effort to simple chance (Gilbert, 2007; Bereciartua, 2012). In a seminal article, (Drucker, 1985) argued that innovation comes about as a result of a conscious search of innovation opportunities that were available in a limited number of situations. He went on to qualify that the four focus areas included unexpected occurrences; incongruities; process needs and industry and market changes. All these areas interacted with each other differently, leading to the need for additional research in this respect.

Distinct from innovation which is an output, innovativeness has also been defined as a continuous process that includes the level and potential that creates a new product, service or process that will be commercialized to allow an economic or social impact (Doroodian, Ab Rahman, Kamarulzaman, & Muhamad, 2014; Neely & Hii, 2012; Hult , Hurley, & Knight, 2004; Gilbert, 2007). Other scholars considered innovativeness as the state of organization or firm's culture that prevails and allows an organization to have a capacity to innovate (Hurley & Hult, 1998). Lawson (2001) tried to differentiate between innovative capability and innovativeness arguing that innovative capability

was a combination of internal and external factors that make the firm to be able to innovate. On the other hand, he argued that innovativeness is internal to the organization thereby making the firm owners to have considerable leverage over it. In this study, firm innovativeness has been used and considered interchangeably with firm level innovative capacity.

Presently, there are on going divergent conversations about differences in levels of innovations amongst different entities some of which are within the same environment and industry (Neely & Hii, 2012). The thrust of the discourse is what really drives the innovativeness of entities. This is against the backdrop that whereas research and experimentation to achieve innovation is very expensive, there's a need to appreciate changes in potential technology and as such trade offs have to be made (Suarez-Villa, 2007).

Innovativeness has been extensively studied by scholars (Oscarsson, 2003; du Preez & Louw, 2008). It has been conceptualised as the process through which an entity changes its operational processes or service, craft new or amended products in the markets, with an intention of realising a more efficient and effective process that eventually leads to greater margins and growth (Damanpour & Wischenevsky, 2006; Perez-Luno, Wiklund, & Cabrera, 2010). It is commonly agreed that innovativeness is affected by both internal and external factors. Firm innovativeness largely depends on how the firm owners react to an external or internal set of stimuli (Lawson, 2001; Hult , Hurley, & Knight, 2004). There is little convergence on the factors that cause and affect innovativeness (Hult et al., 2004) but nevertheless there is a common agreement that environmental and structural characteristics rather than individual characteristics play a significant role in determining firm innovativeness.

The most commonly accepted indicators of innovation and innovativeness, include number and types of new products and services as well as the amount spent on research and development. (OECD, 2005; Massa & Testa, 2008; Perez-Luno & Blasco, 2015). Other indicators include specialised skills of staff, number of licenses, patents and trademarks generated as a result of the activity, information disseminated in literature, the absolute amount of sales of innovative products, the number of innovations, and even the increase in revenue and market share as a result of new products (Massa & Testa, 2008). The indicators may be obtained from either direct primary data collection or from secondary sources. There is however some considerable difficulty in standardizing and quantifying innovativeness in a statistical and quantitative manner (Romijin & Abaladejo, 2002). A variant of the Miller and Friesian, 1983 Scale is also commonly used to measure innovativeness (Miller & Friesian, 1983; Massa & Testa, 2008) whereby, a set of paired statements with a multi-item scale are made to the respondent who then chooses what is closest to their situation.

Bearing in mind, that in some cases, assessments are made on the basis of self-assessments and the informants may not be sincere with all their data (Khan & Manopichetwattana, 1989), and due to the diversity on the indicators of innovativeness, it is important, that an objective study has a broad based measurement tool of these indicators. In this respect, it is common to find self-assessed data by entrepreneurs occasionally being misaligned from the official data which are often derived on the basis of traditional innovation indicators.

Theoretical Foundation

This study is founded on firstly, on the Open Innovation Model as popularized by Henry Chesbrough (du Preez & Louw, 2008; Chesbrough, 2003). The Open Innovation Model uses both internal and external concepts and networks at all stages of the process to support innovation (Chesbrough, 2003) unlike in prior models which had specific entry points for feedback and ideas (du Preez & Louw, 2008). Ideas are generated internally and then developed. It was further observed that not all firms generate and make full use of their internally generated ideas (Ibrahim & Bong, 2017). External ideas, coupled with the use of internal and other external networks that included the experience of other institutional actors were subsequently accepted (Chesbrough, 2003; du Preez & Louw, 2008). Different firms have different kinds of regimes of integration and control depending with the complexity of the task at hand and the amount of resources available to the firm to pursue collaborative research, and the outcome that is at stake.

Open Innovation has nevertheless been criticized as having simplified the innovation process to linear sequences that were then iterated by external networks and feedback (Trott & Hartmann, 2009; Benezech, 2012). There are also doubts on the universal validity of the model for all types of organisations, thus Open Innovation has been criticized as having been modelled on large organisations with very little empirical work on SMEs (Lazzarotti & Manzini, 2009; Benezech, 2012). It is further argued that most extensive research on Open Innovation has been on the more developed economies with limited validation in the developing world.

Manufacturing Small and Medium Enterprises in Kenya

SMEs also contribute significantly to the number of businesses and the number of people employed in Africa (Muriithi, 2017; Ndemo & Mkalama, 2019). In Kenya, SMEs account for over 33% of GDP and well over 80% of employment (KNBS, 2016). With over 7.4 million micro, small and medium enterprises, as at 2015, the SME sector had employed 14.9 million people which was well over 50% of the number of people employed by the formal economy (KNBS, 2016). It has also been demonstrated that the higher the proportion of value of SME output, the more developed an economy is,

because SMEs stimulate wealth creation by causing additional goods, investments flows, job creation, as well as consumption (O'Regan & Ghobadian, 2005; Gilbert, 2007; Muriithi, 2017). The mortality rate for SMEs in Kenya remains high, as almost 46% of firms do not survive beyond one year of their operation (KNBS, 2016).

Due to the extent of broadness of information requirements, there is limited consensus on the causes of firm innovativeness on SMEs at a global level (Ayyagan et al., 2007; Ardic et al., 2011). A myriad of reasons have been identified as being challenges for the growth of SMEs (KIPPRA, 2017; Muriithi, 2017). There have been a number of conscious policy efforts and intervention on the part of the government towards invention, but limited effort towards addressing the innovation diffusion process (Arnold & Thuriaux, 1997). It is nevertheless appreciated that to understand the relationship between entrepreneurial orientation and firm innovativeness within SMEs there is a need to study it separately as opposed to studying it from the context of a large organization (McAdam, Keogh, Reid, & Mitchell, 2007).

Consistent with the Growth Theory, it is imperative that the economic growth is led by manufacturing sector rather than the agricultural sector. Manufacturing sector often ranked among the top three sectors within the production sectors in Kenya (KNBS, 2016). The study adopted the definition of KNBS (2016) of the manufacturing sector as those entities that engaged in physical activities or processes that added value to a product or raw material. Over the previous eleven years, the overall manufacturing sector contributed a stagnant 11% of Kenya income (GOK, 2015) but has been on a downward spiral with a sectoral GDP growth rate of 0.2% in 2017 (World Bank Group, 2018). This was not considered as adequate to address the underlying problems of economic growth. The manufacturing SMEs also have a varied level of specialization and most of their products are designed for low to medium income domestic consumption with some surplus for the export markets to the neighbouring countries (Chege, Ngui, & Kimuyu, 2014). There is a need for the manufacturing sector to undergo a transformational growth for it to achieve a higher long term impact on the development of the country (GOK, 2015). At a national level, the gross production of the manufacturing SMEs still lags at less than 20% of value behind the larger enterprises even though they employ more people (more than 80%) than the larger firms (Chege et al, 2014, KIPPRA, 2017). Unfortunately, with the increased impact of globalization of the economy, the impact of the manufacturing sector in Kenya and Africa in general is at a risk from the more competitive manufacturing industries of China, India and other fast industrializing nations (KIPPRA, 2017). This calls for the need for diversification, enhanced productivity and efficiency in the manufacturing sector.

Research Problem

Whereas there is adequate conceptualization of the relationship between innovation and firm performance, the antecedents of innovation have not been adequately conceptualized (Hult et al., 2004; Avlonitis & Salavou, 2007; Perez-Luno, Wiklund, & Cabrera, 2010). Neither has the moderating action of environmental turbulence similarly been exhaustively conceptualised. The focus of most of the reviewed studies has mostly been on independent variable and its effect on performance leaving a gap on the aspect of antecedents of the dependent variable and its related impact on innovativeness. Conceptually, previous studies had identified a need to conceptualise the relationship between entrepreneurial orientation and firm innovativeness in further detail (Hult et al., 2004; Avlonitis et al., 2007; Perez-Luno et al., 2010).

One of the reasons for the inhibition of growth of SMEs in Kenya has been identified as lack of innovation (KNBS, 2016). This is consistent with the Schumpeterian Theory on Creative Destruction which argues that without innovation, firms have a reduced probability of survival (du Preez & Louw, 2008). SMEs operate under turbulent environments and are therefore under constant pressure to innovate in either product, process or service. The impact of the prevalent innovation systems is also an area that is often ignored. Continually, there is a cocktail of intra-firm actions coupled with a plethora of external institutional reforms to address poor productivity in manufacturing SMEs, but to no much avail (GOK, 2005; GOK, 2013; GOK, 2015). The need for additional research to identify the reason and the additional external factors created a need for further research in this area.

Studies have shown that the productivity of manufacturing SMEs in Kenya is generally low and has been declining (Cusolito & Cirera, 2016). There are glaring gaps in understanding firm-level innovativeness as the dependent variable in the country (Houthoofd & Hendrickx, 2012). Literature review showed that there is a need to understand the factors that affect the relationship between entrepreneurial orientation and innovativeness in Manufacturing SMEs in Kenya. Specifically, a compelling question that needed to be addressed is whether entrepreneurial orientation and environmental dynamism influence the innovativeness of Manufacturing SMEs in Nairobi, Kenya. Contextually, most of the research has been carried out in the developed world and on specific industries and thus may not universally apply. There is thus an established need for research in the additional contextualisation of the dimensions of entrepreneurial orientation (George & Marino, 2011; Rigtering, 2013; Wales, 2016). Due to the complexity of information requirements around SMEs, it has not been possible to exhaustively study this area and thus achieve consensus and more so in developing countries (Khayyat & Lee, 2015).

Research Objectives

This study sought to establish the factors influencing innovativeness within manufacturing SMEs in Nairobi County and had the following specific objectives; -

i. To establish the relationship between entrepreneurial orientation and firm innovativeness of manufacturing SMEs in Nairobi.

ii. To determine the moderating effect of environmental dynamism on the relationship between entrepreneurial orientation and firm innovativeness of manufacturing SMEs in Nairobi.

Conceptual Framework

Entrepreneurial orientation was viewed as a uni-dimensional concept, because previous studies have tended to show a high correlation within these dimensions (Rauch et al., 2009). The study therefore commenced on the premise that entrepreneurial orientation significantly affects innovativeness (Hult, et al., 2004; Avlonitis & Salavou, 2007; Renko et al., 2009; Ejdys, 2016). Environmental dynamism was previously confirmed to affect entrepreneurial orientation of SME firms (O'Regan & Ghobadian, 2005; Miller, 2011) and ultimately, as a moderating variable it affected the relationship between entrepreneurial orientation and firm innovativeness of the SME firms (Perez-Luno et al., 2010; Ruiz-Ortega et al., 2013). This study progressed on the basis that there was a relationship between these variables giving rise to the conceptual model in Figure 2 that was proposed for investigation.

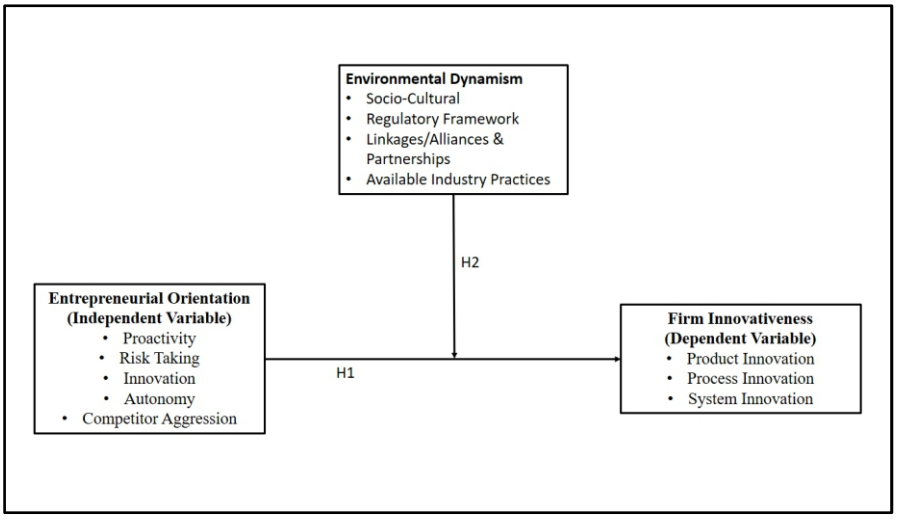

Figure 2: Conceptual Model

Conceptual Hypothesis

A synthesis of the literature review indicated that there was a need to study further the relationship of three variables, namely entrepreneurial

orientation, environmental dynamism and innovativeness of firms. On the basis of the study objectives and the conceptual model, hypotheses were formulated and tested in the study.

As a result of the first objective of the study, the following alternate hypothesis was generated for empirical validation and testing;-

H1: *Entrepreneurial Orientation significantly affects Firm Innovativeness in Manufacturing SMEs.*

The second objective led to the formulation of the second alternate hypothesis;-

H2: *Environmental Dynamism moderates the relationship between Entrepreneurial Orientation and Firm Innovativeness in Manufacturing SMEs.*

Research Methodology

Research and Sampling Design

A positivist approach with a cross sectional survey was used (Saunders, Lewis, & Thornhill, 2009; Blumberg, Cooper, & Schindler, 2014). Researcher interference was limited to the extent of the research strategy which was deductive in nature (Sekaran & Bougie, 2013; Blumberg et al., 2014). The research was carried out over a period of six months, between November 2018 and April 2019. The research population was based on data from Nairobi County Government Registry as at 31st December 2017 which indicated that the total number of licensed firms that had more than 1 Year in operation was 3,962 firms.

The estimated total sample size was arrived at using Yamane's Formulae (Israel, 1992) and was calculated as 363 which was 9.16% of the research population. A multi-stage sampling technique involving probability techniques was used to identify the specific samples to be used in the survey. During the full scale survey, a total of 363 questionnaires were distributed out of which a total of 245 questionnaires were completed and returned. For the purposes of the final analysis, a total of 8 questionnaires were eliminated leaving a total of 237 completed survey responses. This worked out to a response rate of 65.3% which was considered adequate on the basis of previous similar studies by Okeyo, (2014) and Kithusi, (2015).

Data Collection and Instrumentation

Pilot Study

To pre-test the data collection instrument, a pilot study was done. The study involved 40 manufacturing SME firms which were randomly selected, but well distributed across the strata. The main purpose was to address the content and construct validity of the survey instrument, so as to identify and overcome any potential challenges to administering the instrument. Additional

reasons for the test were also to estimate the length of the survey, gauge the experience of the respondents after having gone through the survey, evaluate whether the understanding of the questions was consistent with what the study sought to achieve whilst being conscious of any cultural sensitivities to the way the questions were framed. The questionnaires were subsequently modified and thereafter the main survey was undertaken. None of the respondents used in the pilot survey were used in the main survey.

Data Collection

Data collection for the main survey was carried out between November 2018 and April 2019. A self administered drop and pick questionnaire was issued to each of the identified respondent firms. The number of all questionnaires issued out to respondents was recorded. No incentives were provided to the respondents, but the distributing enumerators were remunerated on piece meal basis, against completed surveys, thereby making it important for them to spend time in building consensus and enthusiasm from the target respondent.

Operationalisation of the Research Variables

Entrepreneurial orientation was constructed in a configurative manner (Lumpkin & Dess, 1996; Lumpkin, 2009; Ruiz-Ortega et al., 2013; Wach, 2015). These dimensions involved elements of subjectivity and relativity and therefore a multi item 5 point Likert scale was used to obtain the data. This was consistent with measurement scales that have previously been used in other studies (Covin & Slewin, 1991; Lumpkin & Dess, 1996, 2001; Lumpkin et al., 2009). In the operationalization of entrepreneurial orientation, innovativeness as a dimension in this study was dropped as a dimension on the independent variables but retained as a dependent variable. This was also consistent with previous research (Sekaran& Bougie, 2013; Joshi et al., 2015; Ejdys, 2016; Gudda, 2017). Subsequently, a composite score for all dimensions was obtained.

Environmental dynamism was treated as a uni-dimensional measure that was operationalized using a composite measure of four indicators. Socio cultural dimensions measured elements of diversity and tastes of the consumers within their indigenous setting. The dimension on regulators assessed the interactions with industry regulators. The dimension on linkages, alliances and partnerships measured the interactions with other players in the same industry or with common goals. The final dimension on available industry practices assessed the level of interactions and familiarity of the firm with the contemporary industry practice. A multi item 5 point Likert Scale, that was consistent with previous studies, was used to evaluate the measures

in environmental dynamism (Miller, 1987; Garg et al., 2003; Wiklund & Shepherd, 2005).

Innovativeness was operationalized in a qualitative way. On the basis of the recommended measurements in the Oslo Manual, a measurement was initially done during the pilot study on the number of products, processes and changes adopted in the respondent firm (OECD, 2005). However, after the pilot survey and in an effort to have more clarity, the measurement was modified to include a three-item 5 point Likert Scale that was deemed to be more effective and accurate in measuring the indicators. These were adapted from the previous measurement scales and focused on new products, risk taking and pro-activeness (Miller & Friesian, 1983; Massa & Testa, 2008; Perez-Luno & Blasco, 2015).

Survey Confirmatory Tests

Tests on Validity are necessary to confirm whether or not the technique as designed, measures the desired outcome (Blumberg, et al., 2014). To address construct and content validity, peer review and feedback assisted in the construction of the questionnaire. The resultant instrument was used in the pilot study. Upon an analysis of the pilot study results, the questionnaires were subsequently modified to ensure that internal and external validity of the instruments is as required. At this stage, ambiguous, unclear and irrelevant questions in the questionnaire were also clarified and/or expunged all together. In addition, there were a series of post administration evaluation checks to confirm the completeness of the questionnaires.

Tests of Reliability were carried out to confirm the extent of measurement errors by the technique that was applied (Saunders, et al, 2009; Sekaran & Bougie, 2013). For this reason, the Cronbach's Alpha coefficient was determined. The entrepreneurship orientation subscale consisted of 24 items ($\alpha = 0.805$). The items for environmental dynamism were 18 ($\alpha = 0.606$) whilst the items for firm innovativeness were 3 ($\alpha = 0.724$). Previous research recommended that a coefficient higher than 0.5 should be considered as acceptable, with a score that is greater than 0.7 being considered as strongly reliable (Sekaran & Bougie, 2013; Kithusi, 2015). The tests for entrepreneurial orientation and firm innovativeness were considered as very reliable whilst the results for environmental dynamism were considered as reliable. To assess the extent of multicollinearity between the independent variables and dependent variables, Tolerance Value and their inverse, the Variance Inflation Factor (VIF) were calculated (Sekaran & Bougie, 2013). From the results, the VIF value was well below 5 and therefore multicollinearity was not deemed to be present in all the tested variables. The implication of this confirmation was that the study data could be used to model generalized linear regression equations with a considerable degree of accuracy.

Data Analysis

As a preliminary step, upon receipt of the completed questionnaire, they were checked for consistency on the numbered serialization and to isolate any obvious inconsistencies. Data coding, and entry thereafter happened. These were subsequently reviewed for any data entry errors or illogical gaps and responses. In a few cases, there was a further follow up to obtain clarity on the illogical gaps or responses. Analysis was then carried out using Version 25 of the Statistical Package for the Social Sciences (SPSS) to search for trends and relationships in the data. Descriptive Analysis was used on all recorded responses, to ascertain the frequency distribution, mean, and the standard deviations of the various observed characteristics.

Inferential analysis was used to test the indicators of the various variables which were then modelled into various regression equations. Inferential statistics allowed the determination of relationships and drawing of conclusions on the basis of the sample (Sekaran & Bougie, 2013). On the basis of the Conceptual Model shown in Figure 1, various models and tools were adopted. The study adopted the configurational model (Covin & Slevin, 1991; Wiklund & Shepherd, 2005; Andersen, et al., 2015).

A Multiple Regression Model (MRM) was used to test the hypothesis that entrepreneurial orientation significantly affects firm innovativeness (Hair, Black, Babin, & Anderson, 2014). The following model was applied: -

$$Y_1 = \alpha_1 + \beta_{10}X + \varepsilon_1$$

Where Y_1 = Firm Innovativeness; X = Composite Entrepreneurial orientation; ε_1 = Error

The composite score for Entrepreneurial Orientation represents aggregated effects of each of the sub variables. A positive coefficient (β) indicates a positive correlation between the predictor and the outcome variable.

To test the hypothesis that environmental dynamism moderated the relationship between entrepreneurial orientation and firm innovativeness, the Hierarchical Regression Modelling (HRM) was used. HRM involves the addition of independent variables into an equation until the addition no longer made a contribution to the variation (R^2) (Lewis, 2007). In the study, the model used was:-

$$Y_2 = \alpha_2 + \beta_{21}X + \beta_{22}X_2 + \beta_{23}X.X_2 + \varepsilon_2$$

Where X= Composite score for Entrepreneurial Orientation; X_2 = Composite Score for Environmental Dynamism; ε_2 = Error.

There were 237 samples available and the specified degrees of freedom was 2. This was considered adequate.

Research Findings

Descriptive Analysis

This study obtained information on various characteristics, so as to determine the profile of the respondent firms. A majority of the entrepreneurs in the study were aged above 45 years. Furthermore 83% of the surveyed firms were principally owned by men whereas 17% of the surveyed firms were principally owned by women. More than 63% of the respondent firms had more than 15 years of operation in manufacturing. Conversely, 8.5% of the respondent firms had less than 5 years of operation.

Inferential Analysis

Tests on Hypothesis Between Entrepreneurial Orientation and Firm Innovativeness

The Study sought to establish the relationship between entrepreneurial orientation and innovativeness using the following hypothesis: -

H_0: Entrepreneurial Orientation does not significantly affect Firm Innovativeness in Manufacturing SMEs

H_1: Entrepreneurial Orientation significantly affects Firm Innovativeness in Manufacturing SMEs

Regression equations were modelled to test the independent effect of entrepreneurial orientation on firm innovativeness. The relationship was also modelled on the basis of a composite score for entrepreneurial orientation. The model summary is shown in Table 5: -

Table 5: Effect of Entrepreneurial Orientation on Firm Innovativeness

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.345a	.119	.114	.64166

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.056	1	10.056	24.423	000b
	Residual	74.522	181	0.412		
	Total	84.577	182			

Notes: MODEL SUMMARY a. Predictors: (Constant), Composite score for Entrepreneurial Orientation ANOVA a. Dependent Variable: Firm Innovativeness b. Predictors: (Constant), Composite score for Entrepreneurial Orientation

Source: Field Data, 2019

The model was moderate $R = 0.345$ (Hagquist & Stenbeck, 1998). The adjusted coefficient of determination, $Ra^2 = 0.114$ was comparatively weak but acceptable (Moksony, 1990; Hagquist & Stenbeck, 1998; Rigtering, 2013; Kithusi, 2015). In spite of this, the overall composite model was still statistically significant, F (1,182) = 24.423, $p < 0.05$. These findings were consistent with the previous research findings (Hult, et al., 2004; Avlonitis & Salavou, 2007; Renko et al., 2009; Perez-Luno et al., 2010).

The Table of Coefficients for the derived model is shown as Table 6:-

Table 6: Coefficients for Effect of Entrepreneurial Orientation on Firm Innovativeness

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1.996	.384		5.194	.000
	Composite score for Entrepreneurial Orientation	.581	.118	.345	4.942	.000
a. Dependent Variable: Firm Innovativeness						

Source: Field Data, 2019

The study confirms that entrepreneurial orientation affects innovativeness. The resultant equation is therefore as shown below: -

$Y_1 = 1.996 + 0.581X$

Where: X = Composite Score for Entrepreneurial Orientation.

The regression equation indicates that the value of firm innovativeness is equal to 1.996 when the composite value of entrepreneurial orientation is 0. The slope of the regression equation is 0.581.

The overall composite model was statistically significant, F (1,182) = 24.423, $p < 0.05$. As a result of this, *the study failed to reject the hypothesis that Entrepreneurial Orientation significantly affects Firm Innovativeness in Manufacturing SMEs in Nairobi County, Kenya.*

Tests on Hypothesis Between Entrepreneurial Orientation, Environmental Dynamism and Firm Innovativeness

The study also sought to determine whether the moderating influence of environmental dynamism affects the relationship between entrepreneurial orientation and firm innovativeness on Manufacturing SMEs in Nairobi using the following hypothesis: -

H_0: *Environmental Dynamism does not moderate the relationship between Entrepreneurial Orientation and Firm Innovativeness in Manufacturing SMEs.*

H_2: Environmental Dynamism moderates the relationship between Entrepreneurial Orientation and Firm Innovativeness in Manufacturing SMEs.

The variables were modelled into a hierarchical regression equation. This involved a systematic addition of additional variables into the model until the desired model was obtained. Three models were developed. The models had different and incremental variables that were to be measured. The third model was selected as the final model on the basis of improved coefficients and its summary is shown in Table 7.

Table 7: Effect of Environmental Dynamism on the Relationship Between Entrepreneurial Orientation and Firm Innovativeness

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.345[a]	0.119	0.114	0.64166
2	.358[b]	0.128	0.118	0.6401
3	.373[c]	0.139	0.125	0.63768

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	10.056	1	10.056	24.423	.000[b]
	Residual	74.522	181	0.412		
	Total	84.577	182			
2	Regression	10.827	2	5.413	13.212	.000[c]
	Residual	73.751	180	0.41		
	Total	84.577	182			
3	Regression	11.789	3	3.93	9.664	.000[d]
	Residual	72.788	179	0.407		
	Total	84.577	182			

Notes: MODEL SUMMARY a. Predictors: (Constant), Composite score for Entrepreneurial Orientation; b. Predictors: (Constant), Composite score for Entrepreneurial Orientation, Environmental Dynamism; c. Predictors: (Constant), Composite score for Entrepreneurial Orientation, Environmental Dynamism, Entrepreneurial Orientation and Environmental Dynamism.
ANOVA a. Dependent Variable: Firm Innovativeness; b. Predictors: (Constant), Composite score for Entrepreneurial Orientation; c. Predictors: (Constant), Composite score for Entrepreneurial Orientation, Environmental Dynamism; d. Predictors: (Constant), Composite score for Entrepreneurial Orientation, Environmental Dynamism, Entrepreneurial Orientation and Environmental Dynamism
Source: Field Data, 2019

The third model had a coefficient of variation of R= 0.373 which indicates a moderate relationship. The coefficient of determination, R^2 = 0.139. The Ra^2 = 0.125 indicates an over fitting of the model. It further indicates that 12.5% of the dependent variables are explained by the independent variables. A previous research by Perez-Luno et al., (2010) similarly used low values of coefficients of determination.

The coefficients of the Hierarchical Regression Model are presented in Table 8:-

Table 8: Coefficients for Effect of Environmental Dynamism on Effect of Entrepreneurial Orientation on Firm Innovativeness

Model		Coefficients[a] Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.996	.384		5.194	.000
	Composite score for Entrepreneurial Orientation	.581	.118	.345	4.942	.000
2	(Constant)	1.782	.414		4.307	.000
	Composite score for Entrepreneurial Orientation	.457	.148	.271	3.090	.002
	Environmental Dynamism	.212	.154	.120	1.372	.172
3	(Constant)	5.488	2.444		2.245	.026
	Composite score for Entrepreneurial Orientation	-.645	.732	-.383	-.882	.379
	Environmental Dynamism	-1.013	.811	-.576	-1.249	.213
	Entrepreneurial Orientation and Environmental Dynamism	.360	.234	1.217	1.538	.126

a. Dependent Variable: Firm Innovativeness

Source: Field Data, 2019

The table of coefficients suggests that a combination of entrepreneurial orientation and environmental dynamism has the highest impact on firm innovativeness. Essentially, a unit change in the combined proportions of environmental dynamism and entrepreneurial orientation will trigger a 1.217 unit change in firm innovativeness.

The study infers that the sole effect of environmental dynamism on the relationship between entrepreneurial orientation and firm innovativeness is not statistically significant. In addition to this, the influence of the individual variables - entrepreneurial orientation, environmental dynamism and combined environmental dynamism and entrepreneurial orientation are not statistically significant as their individual *p*-values are 0.379, 0.213, and 0.126 respectively, being above 0.05. However, the overall composite model was judged as statistically significant, F (3,182) =9.664, $p < 0.05$. The findings suggest that the variables only correlate and become statistically significant when interacting but not individually by themselves.

The Hierarchical Regression Model obtained is indicated below: -

$$Y_2 = 5.488 - 0.645X - 1.013X_2 + 0.360X.X_2$$

Where Y_2 = Firm Innovativeness; X= Composite score for Entrepreneurial Orientation; X_2 = Composite Score for Environmental Dynamism.

The inclusion of the three afore-mentioned variables into the regression model has been confirmed as acceptable by other scholars (Wasserstein & Lazar, 2016; Greenland, et al., 2016; Gagnier, 2017; Heinze & Dunkler, 2017).

Reviewing the analysis of the variance of the overall model, indicates it to be statistically significant, F (3,182) = 9.664, $p < 0.05$. *The study therefore failed to reject the hypothesis that Environmental Dynamism moderates the relationship between Entrepreneurial Orientation and Firm Innovativeness in Manufacturing SMEs.*

Discussion of Findings

Relationship Between Entrepreneurial Orientation and Firm Innovativeness

The first objective sought to establish the influence of entrepreneurial orientation on firm innovativeness. The study results indicated that entrepreneurial orientation manifests itself in firm innovativeness. The manifestation varied in different ways as a result of the various dimensions that influence the composition of entrepreneurial orientation. The study established that entrepreneurial orientation affected innovativeness, $t\ (1,182) = 4.942,\ p<0.05,\ \beta = 0.345$. As was shown by previous studies, entrepreneurial orientation manisfested itself as a result of the manifestations across the various component dimensions of risk taking, pro-activeness, autonomy and competitor aggression (Avlonitis & Salavou, 2007; Joshi et al., 2015; Perez-Luno et al., 2010; Ejdys; Gudda, 2017). These intra-dimensions varied and occasionally produced different outcomes (Perez-Luna et al., 2010; Joshi et al., 2015; Ejdys, 2016; Gudda, 2017). Other studies indicated that the intra-dimension relationships varied with the complexity of the individual firms (Lumpkin & Dess, 1996; Wiklund & Shepher, 2005; Yi-Ying, 2011; Voeter, 2015).

This study therefore inferred that there is an interacting action between the various dimensions of entrepreneurial orientation that affects firm innovativeness. This is plausible bearing in mind that under open innovation model, there is a continuous interplay of various ideas and factors that ultimately affect the outcome. The model was found to be statistically significant, $F\ (1,182) = 24.423,\ p < 0.05$ thereby failing to reject the hypothesised relationship that entrepreneurial orientation significantly affected firm innovativeness.

Relationship Between Entrepreneurial Orientation, Environmental Dynamism and Firm Innovativeness

The second objective of the study sought to establish whether there is a moderating influence of environmental dynamism on the relationship

between entrepreneurial orientation and firm innovativeness. The composite overall model in the relationship was statistically significant, $F\ (3,182) = 9.664,\ p<0.05$. However, the findings suggested that, within the model as displayed in Table 8, coefficient of environmental dynamism was found to be inversely related though statistically insignificant, $t= -1.249,\ p> 0.05,\ \beta = -1.013$, suggesting that by itself, it does not affect firm innovativeness. This finding is quite inconsistent with Pustovrh, et al., 2017 who established that there was a strong linkage between external factors and innovativeness. Previous findings also concluded that environmental dynamism affected innovativeness (Khan & Manopichetwattana, 1989; Chang et. al., 2011; Ruiz-Ortega et al., 2013; Staniewski et al., 2016; Zhai et al., 2018).

The results of the overall model nonetheless failed to reject the hypothesised relationship that environmental dynamism had a moderating influence on the relationship between entrepreneurial orientation and firm innovativeness. This finding leads to the notion, that there was an interacting effect on the relationship leading to the statistical significance. Numerous studies previously shown that environmental dynamism had a moderating influence on the external environment under which a firm operates thereby triggering a reaction that causes the firms to be innovative (Miles et al, 2000; Zhou, 2006; Wijbenga & van Witteloostuijn, 2007; Okeyo, 2014; Bouncken et al., 2014). On the other hand, Bodlaj & Carter (2018) concluded that innovation had a mediating relationship on the relationship between environmental dynamism and firm innovativeness.

SMEs are often minor players in the market. They will rely on external support to trigger an *environmental persuasion* that allows the innovation to spread. This support will only be possible if it is not deemed to be risky in approach. The findings by Covin & Slewin (1989) and Wiklund & Shepherd, (2005) posited that pro-activeness of entrepreneurs was dependent on an enabling environment for it to stimulate innovativeness. This can be said to be a reaction to external circumstances and aligned to Open Innovation, whereby firms continuously adopt ideas and knowledge of what the external competition and industry are doing (Chesbrough, 2003). Being perforated entities, there is a consistent inflow and outflow of ideas and information (Neely & Hii, 2012). This study suggests that being small and versatile, SMEs are able to quickly adopt changes that are suitable to their strategy. This supports OIM which is predicated on the continuous absorption of external ideas to regenerate the existing ones.

Conclusions and Implications

Conclusion

Inferential analysis indicated that the three variables, entrepreneurial orientation and environmental dynamism affected firm innovativeness in

different ways. The study test results were all statistically significant and therefore the study did not reject any of the alternate hypothesis. The study infers that firm innovativeness is a function of entrepreneurial orientation which is affected by environmental dynamism.

Implications of Study Findings

It is apparent that there are glaring gaps in the conceptualization of SME Innovation. It is also observed that due to complexity of information requirements in SMEs, a research that allows insightful generation of information is necessary. The need for research on open innovation in SMEs in developing countries is undoubtedly gaining currency. The study has been able to demonstrate that firms do not operate in isolation from their peculiar environments. This calls for similar research in the less developed countries in much as much of it is presently happening in the developed countries.

It has been argued in the study that environmental dynamism affects firm innovativeness. It is therefore correct to assume that contributors to SMEs innovativeness are circumstantially different. Firm also need to be aware of the environmental dynamism and continuously survey the environmental landscape so as to take appropriate action. Instead of focusing on the outcomes of innovation, entrepreneurs would obtain higher value by focusing on processes which include the basic support infrastructure and other social links that the firms are involved in. The study further emphasized the importance for SMEs to understand and evaluate their disposition and impact of environment in so far as strategies for innovation are concerned. The firms must out of necessity identify their reaction to various external dynamics that will ultimately affect the market place. There is need for additional research that could involve more commonly designed longitudinal and qualitative studies.

An easier way of facilitation of cross firm engagements is through the involvement of multiple firms. Intercompany alliances, cooperative and strategic industry associations should be encouraged and be formed. A study by Bougrain and Haudeville, (2002) however argued that firms firstly need to develop their own internal capabilities before seeking external cooperation. The Government should nevertheless facilitate this by aiding and encouraging the formation of the inter-firm alliances and strategic associations. This strategy was found to be effective in Croatia by Radas & Bozic (2017). Through these associations, various interventions can be pursued.

Manufacturing SMEs should be encouraged to not only produce for local markets but also as exporters. With the current globalization efforts and the signing of the African Continental Free Trade Agreement (GOK, 2015; AfDB, 2018), SMEs need to look beyond their traditional markets (KAM, 2019). Specifically, there needs to be conscientious efforts to address the

hurdles that limit the exports to non traditional markets, and thereafter targeted incentives to address these challenges. Wider markets would spur innovativeness as entrepreneurs would be compelled to generate additional products, simplify processes as well as invest in value addition systems and technology. For this to be successful, a series of well thought out and executed institutional reforms will be vital.

Limitations of Study and Future Research Directions

It has been previously observed that information requirements on SMEs studies tend to be problematic (Ayyagan et.al., 2007). This study faced similar challenges. Most SME entrepreneurs were fairly reluctant to releasing information that was specific to the firm. Significant effort was made in getting the entrepreneurs to feel confident to divulge such information. Consistent with the recommendations of Kraus et al., 2010, it is recommended that future studies should not be solely single approach but rather adopt mixed method approach. Furthermore, the study design was also cross sectional in nature and as such could not explore causal relationships. This is more so in instances of exploitative innovation which are quire prevalent in SMEs due to their limited level of investment.

Survival bias on studies of SMEs are very prevalent (Rauch et.al, 2009; Kraus et.al.,2010). This was observed in the study, as were there numerous instances, whereby some names that were initially on the sample design had to be struck out because by the time the research assistant contacted the sample firm, it had either changed their line of business or gone out of business altogether. The study therefore could not be able to obtain the benefit of these firm's experience in study and therefore confirm or reject such views.

Finally, the study models yielded fairly weak variability measures (R^2) and which were in all cases less than 20%. The implication of this observation is that there are additional variables that may not have been considered in the study. This finding aligns itself to the discourse by George and Marino (2011), Andersen et al., (2015) and Wales (2016). This is an area that could be studied further possibly by way of dissecting further the samples by sizes.

References:

1. AfDB. (2018). *East Africa Economic Outlook.* Abidjan: African Development Bank. Retrieved August 2018 9, 2018, from East Africa Economic Outlook 2018: https;//www.afdb.org/fileadmin/.../Africa-Economic-Outlook-2018-East-Africa-pdf
2. Al-Nuiami, M., Idris, W. M., AL-Feroukh, F. A., & Joma, M. H. (2014). An Empirical Study of the Moderator Effect of entrepreneurial Orientation on the Relationship between Environmental Turbulence

and Innovation Performance in Five Star Hotels in Jordan. *International Journal of Business Administration, 5*(2).

3. Andersen, B. S., Kreiser, P. M., Kuratko, D. F., Hornsby, J. S., & Eshima, Y. (2015). Reconceptualising Entrepreneurial Orientation. *Strategic Management Journal, 36*, 1579-1596.
4. Ardic, O. P., Mylenko, N., & Saltane, V. (2011). *Small and Medium Enterprises: A Cross Country Analysis with a New Data Set.* The World Bank Group, Financial and Private Sector Development Consultative Group. The World Bank Group.
5. Arnold, E., & Thuriaux, B. (1997). *Developing Firm's Technological Capabilities - Report for the OECD.* Technopolis Limited.
6. Avlonitis, G. J., & Salavou, H. E. (2007, January). Entrepreneurial Orientation of SMEs, product innovativeness, and performance. *Journal of Business Research, 60*, 566-575.
7. Benezech, D. (2012, February). The Open Innovation: Some Issues regarding its internal consistency. *Journal of Innovation Economics and Management*(10), 145-165.
8. Blumberg, B. F., Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods* (Fourth Edition ed.). London, UK: McGraw Hill Education.
9. Bodlaj, M., & Cater, B. (2018, October 16). The Impact of Environmental Turbulence on the PerceivedImportance of Innovation and Innovativeness in SMEs. *Journal of Small Business Management*.
10. Chang, Y.-Y., Hughes, M., & Hotho, S. (2011). Internal and external Antecedents of SMEs' innovation ambidexterity outcomes. *Management Decision, 49*(10), 1658-1676.
11. Chege, J., Ngui, D., & Kimuyu, P. (2014). *Scoping Paper on Kenyan Manufacturing.* United Nations University, World Institute for Development Economics Research. Helsinki: UNU-WIDER.
12. Chesbrough, H. (2003). The Era of Open Innovation. *MIT Sloan Management Review, 44*(3), 35-41.
13. Covin, J. G., & Lumpkin, G. T. (2011). Entrepreneurial Orientation Theory and Research: Reflections on a needed Construct. *Entrepreneurship: Theory and Practice, 35*(5), 855-872.
14. Covin, J. G., & Slevin, D. P. (1989). Strategic Managment of small firms in hostile and benign environments. *Strategic Management Journal, 10*, 75-87.
15. Covin, J. G., & Slevin, D. P. (1991). A Conceptual model of entrepreneurship as firm behaviour. *Entrepreneurship: Theory and Practise, 16*(1), 7-25.

16. Covin, J. G., & Wales, W. J. (2012). The Measurement of Entrepreneurial Orientation. *Entrepreneurship: Theory and Practice, 36*(4), 677-702.
17. Covin, J., & Slewin, D. P. (1989). Strategic managment of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75-87.
18. Cusolito, A. P., & Cirera, X. (2016). *A Firm Level Productivity Diagnostic for Kenya's Manufacturing and Services Sector.* World Bank Group, Trade & Competitiveness Global Practise. Washington D.C.: World Bank Group.
19. Doroodian, M., Ab Rahman, M. N., Kamarulzaman, Y., & Muhamad, N. (2014, September 30). Designing and Validating a Model for Measuring Innovation Capacity Construct. *Advances in Decision Science, 2014*(576596), 1-11.
20. Drucker, P. F. (1985). The Discipline of Innovation. In P. F. Drucker, *Innovation and Entrepreneurship: Practise and Principles.* Harper & Row.
21. du Preez, N. D., & Louw, L. (2008). A Framework for Managing the Innovation Process. IEEE Xplore.
22. Ejdys, J. (2016). Entrepreneurial Orientation and Innovativeness of Small and Medium Enterprises. *Journal of Engineering, Project and Production Management, 6*(1), 13-24.
23. Fatoki, O. (2012). Entrepreneurial Orientation, Debt Finance and Refinancing of Small and Medium Entreprises in South Africa. *Journal of Social Sciences*, 32(2), 121-131.
24. Gagnier, J. J. (2017, September). Misconceptions, Misuses, and Misinterpretations of P Values and Significance Testing. *Journal of Bone and Joint Surgery, 99*, 1598-1603.
25. Garg, V. K., Walters, B. A., & Priem, R. L. (2003). Chief Executive Scanning Emphases, Environmental Dynamism, and Manufacturing Firm Performance. *Strategic Management Journal, 24*, 725-744.
26. George, B. A., & Marino, L. (2011, September). The Epistemology of Entrepreneurial Orientation: Conceptual Formation, Modeling, and Operationalization. *Entrepreneuriship, Theory and Practice*, 989-1024.
27. Gilbert, D. (2007, August). Firm Innovativeness in SMEs: Lessons from Japan. *International Journal of Organisation Behaviours, 12*(1), 126-143.
28. GOK. (2005). *Sessional Paper No. 2 on Development of Micro and Small Entreprises for Wealth and Employment Creation for Poverty Reduction.* Republic of Kenta, Ministry of Labour and Human Resource Development. Nairobi: Government Printer.

29. GOK. (2013). *Sessional Paper No.3 of 2013 on National Productivity Policy.* Government of Kenya, Department of Labour, Nairobi.
30. GOK. (2015). *Kenya's Industrial Transformation Programme.* Government of Kenya, Ministry of Industry and Enterprise Development, Nairobi.
31. Greenland, S., Senn, S. J., Rothman, K. J., Carlin, J. B., Poole, C., Goodman, S. N., & Altman, D. G. (2016, May). Statistical Tests, P Values, Confidence Intervals, and Power: A Guide to Misinterpretations. *European Journal of Epidemiology, 31,* 337-350.
32. Gudda, F. O. (2017). Effect of Entrepreneurial Orientation on SME Product Innovativeness. *International Journal of Management and Commerce Innovations, 5*(2), 829-833.
33. Hagquist, C., & Stenbeck, M. (1998). Goodness of Fit in Regression Analysis - R Squared and G Squared Reconsidered. *Quality & Quantity, 32,* 229-245.
34. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Mulrivariate Data Analysis.* Essex, UK: Pearson Education Limited.
35. Heinze, G., & Dunkler, D. (2017). Five Myths About Variable Selection. *Transplant International, 30,* 6-10.
36. Houthoofd, N., & Hendrickx, J. (2012). *Industry Segment effects and firm effects on firm performance in Single Industry firms.* HUBS.
37. Hult , G. M., Hurley, R. F., & Knight, G. A. (2004, July). Innovativeness: Its Antecedents and Impact on Business Performance. *Industrial Marketing Management, 33*(5), 429-438.
38. Hurley, R. F., & Hult, G. M. (1998). Innovation, Market Orientation and Organsiational Learning. *Journal of Marketing, 62,* 42-54.
39. Ibrahim, N. A., & Bong, Y. B. (2017, September). Open Innovation: A Bibliographic Study.
40. Israel, G. (1992). *Determining Sample Size.* Fact Sheet, University of Florida, Institute of Food and Agricultural Sciences, Gainesville.
41. Jansen, J. P., Vera, D., & Crossan, M. (2009). Strategic Leadership for exploration and exploitation: The Moderating role of environmental dynamism. *The Leadership Quarterly, 20,* 5-18.
42. Jiao, H., Alon, I., Kwong, K. C., & Chui, Y. (2013). The Moderating Effects of Environmental Dynamism on the Relationship between Dynamic Capabilities Strategy and New Venture Performance in an Emerging Market. *Journal of Engineering and Technology Management, 30*(2), 188-205.
43. Joshi, M. P., Das, S. R., & Mouri, N. (2015, April). Antecedents of Innovativeness in Technology-Based Services (TBS): Peering into the Black Box of Entrepreneurial Orientation. *Decisions Sciences, 46*(2).

44. KAM. (2019, March). *Manufacturing Priority Agenda 2019: Closing the Manufacturing Gap through the Big 4 Agenda for Shared Prosperity.* Kenya Association of Manufacturers, Nairobi. Retrieved from Kenya Association of Manufacturers: www.kam.co.ke/
45. Khan, A. M., & Manopichetwattana, V. (1989, May). Innovation and Noninnovative Small Firms: Types and Characteristics. *Management Science, 35*(5), 597-606.
46. Khayyat, N. T., & Lee, J.-D. (2015). A Measure of Technological Capabilities for Developing Countries. *Technological Forecasting & Social Change, 92*, 210-223.
47. KIPPRA. (2017). *Kenya Economic Report 2017.* Kenya Institute for Public Policy Research and Analysis. Nairobi: KIPPRA.
48. Kithusi, A. N. (2015). *Firm Resources, External Environment, Entrepreneurial Strategy and Performance of Micro, Small and Medium Furniture Sector Enterprises in Nairobi City County, Kenya.* Unpublished PhD Thesis, University of Nairobi, Nairobi.
49. KNBS. (2016). *Micro, Small and Medium Establishment (MSME) Survey: Basic Report.* Kenya National Bureau of Statistics. GOK.
50. Kraus, S., Coen Rigtering, J. P., Hughes, M., & Hosman, V. (2012). Entrepreneurial Orientation and the business performance of SMEs: a quantitative study from Netherlands. *Rev. Manag. Science, 6*, 161-182.
51. Kreiser, P. M., Marino, L. D., Kuratko, D. F., & Weaver, K. M. (2013). Disaggregating entrepreneurial orientation: the non-linear impact of innovativeness, proactiveness and risk taking on SME performance. *Small Business Economics, 20*, 273-291.
52. Kuratko, D. F., Ireland, J. S., & Hornsby, J. S. (2001). Improving Firm Performance through Entrepreneurial Actions: Acordia's Corporate Entrepreneurship Strategy. *The Strategies and Employee Development*, 60-71.
53. Laforet, S. (2011). A framework of organisational innovation and outcomes in SMEs. *International Journal of Entrepreneurial Behaviour & Research , 17*(4), 380-408.
54. Lawson, B. (2001, September). Developing Innovation Capability in Organisations: A Dynamic Capabilities Approach. *International Journal of Innovation Management, 5*(3), 377-400.
55. Lazzarotti, V., & Manzini, R. (2009, December). Different Modes of Open Innovation: A Theoretical Framework and Empirical Study. *International Journal of Innovation Management, 13*(4), 615-636.
56. Lewis, M. (2007). Stepwise versus Hierachical Regression: Pros and Cons. *Annual Meeting of the Southwest Education Research Association.* San Antonio.

57. Lumpkin, G. T., & Dess, G. G. (1996). Clarifying the Entrepreneurial Orientation Construct and linking it to Performance. *The Academy of Management Review, January 1996*, 21.
58. Lumpkin, G. T., Cogliser, C. C., & Schneider, D. R. (2009). Understanding and Measuring Autonomy: An Enterpreneurial Orientation Perspective. *Entreprenuership: Theory and Practice, 33*(1), pp. 47-69.
59. Lumpkin, G., & Dess, G. G. (2001). Linking Two Dimensions of Entrepreneurial Orientation to firm Performance: The Moderating Role of Environment and Industry Life Cycle. *Journal of Business Venturing, 16*, 429-451.
60. Martins, E. C., & Terblanche, F. (2003). Building Organsiational Culture that stimulates creativity and innovation. *European Journal of Innovation Management, 6*(1), 64-74.
61. Massa, S., & Testa, S. (2008). Innovation and SMEs: Misaligned perspectives and goals among Entrepreneurs, Acadmics and Polciy Makers. *Technovation, 28*, 393-407.
62. McAdam, R., Keogh, W., Reid, R. S., & Mitchell, N. (2007). Implementing innovation management in Manufacturing SMEs: A longitudinal Study. *Journal of Small Business and Enterprise, 14*(3), 385-403.
63. Miles, M. P., Covin, J. G., & Heeley, M. B. (2000). The Relationship between Environmental Dynamism and Small Firm Structure, Strategy and Performance. *Journal of Marketing Theory and Practice, 8*(2), 66-78.
64. Miller, D. (1983). The Correlates of Entrepreneurship in Three Types of Firms. *Management Science*, 29, 770-791.
65. Miller, D. (1987). The Structural and Environmental Correlates. *Strategic Management Journal, 8*(1), 55-76.
66. Miller, D. (2011). Miller (1983) Revisited: A reflection on EO research and some suggestions for the future. *Entrepreneurship: Theory & Practice, 35*(5), 873-894.
67. Miller, D., & Friesian, P. H. (1983). Strategy Making and the Environment: The Third Link. *Strategic Management Journal, 4*, 221-235.
68. Miller, D., & Toulouse, J.-M. (1986). Chief Executive personality and Corporate Strategy and structure in small firms. *Management Science, 32*(11), 1389-1410.
69. Mkalama, B. W., Ndemo, B. E., & Maalu, J. K. (2018, September 10). The Antecedents of Innovativeness in Small and Medium Manufacturing Enterprises in Kenya: A Critical Review of Literature. *African Journal of Business Management, 12*(7), 527-535.

70. Moksony, F. (1990). Small is Beautiful: The Use and Interpretation of R-Squared in Sociological Research. *Szociologiai Szemle, Special Issue*.
71. Muriithi, S. M. (2017). African Small and Medium Enterprises (SMEs), Contributions, Challenges, and Solutions. *European Journal of Research and Reflections in Management Sciences, 5*(1), 36-48.
72. Musawa, M., & Ahmad, K. (2018). A Conceptual Framework for the Influence of Entrepreneurial Orientation and Environmental Dynamism on Marketing Innovation Performance in SMEs. *Business and Economics Journal, 9*(3).
73. Ndemo, B., & Mkalama, B. (2019, November). Micro, Small and Medium Enterprises in Kenya: Current State, Opportunities and Challenges. In T. H. Tambunan, *Development of MSMEs in Developing Countries: Stories from Asia, Africa and Latin America* (Vol. 3, pp. 236-250). New Delhi: AkiNik Publications.
74. Neely, A., & Hii, J. (2012). The Innovative Capacity of Firms. *Nang Yan Business Journal, 1*(1), 47-53.
75. Ngugi, J. K., Mcorege, M. O., & Muiru, J. M. (2013, January). The Influence of Innovativeness on the Growth of SMEs in Kenya. *International Journal of Business and Social Research, 3*(1), 25-31.
76. OECD. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data - 3rd Edition.* Paris: Organisation for Economic Co-operation and Development.
77. Okeyo, W. O. (2014, August). The Influence of Business Environmental Dynamism, complexity and Munifiscence on Performance of Small and Medium Enterprises in Kenya. *International Journal of Business and Social Research, 4*(8).
78. O'Regan, N., & Ghobadian, A. (2005). Innovation in SMEs: The impact of Strategic Orientation and environmental perceptions. *International Journal of Productivity and Perfromance Management, 54*(2), 81-97.
79. Otieno, S., Bwisa, H. M., & Kihoro, J. M. (2012). Influence of Entrepreneurial Orientation on Kenya's Manufacturing Firms operating under East African Regional Integration. *International Journal of LEarning and Development, 2*(1).
80. Perez-Luno, A., & Blasco, M. F. (2015, August). Analyzing the Characteristics of Firms with Better Innovative Performance. *Journa l of Business and Economics, 6*(8), 1438-1458.
81. Perez-Luno, A., Wiklund, J., & Cabrera, R. V. (2010). The Dual Nature of innovative activity: How entrepreneurial orientation influences innovation generation and adoption. *Journal of Business Venturing (Article in Press)*.

82. Pustovrh, A., Jaklic, M., Martin, S. A., & Raskovic, M. (2017). Antecedents and Determinants of high tech SMEs Commercialisation enablers: Opening the black box of open innovation practices. *Economic Research- Economska Istrazivanja, 30*(1), 1033-1056.
83. Radas, S., & Bozic, L. (2009). The Antecedents of SME Innovativeness in an Emerging Transition Economy. *Technovation, 29*, 438-450.
84. Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009 йил May). Entrepreneurial Orientation and Business Performance:An assessment of past research and suggestions for the future. *Entrepreneurship Theory and Practise, 33*(3), 761-787.
85. Renko, M., Carsud, A., & Brannback, M. (2009). The Effect of a Market Orientation, Entrepreneurial Orientation and TEchnological Capability on Innovativeness: A Study of Young Biotechnology Ventures in the United States and in Scandinavia. *Journal of Small Business Management, 47*(3), 331-369.
86. Rigtering, J. C. (2013). *Entrepreneurial Orientation: Multilevel Analysis and Consequences.* Unpublished PhD Dissertation, Utrecht University Shool of Economics, Tjalling C. Koopmans Institute.
87. Romijin, H., & Abaladejo, M. (2002). Determinants of Innovation Capability in Small Electronics and Software Firms in South East England. *Research Policy, 31*(7), 1053-1067.
88. Ruiz-Ortega, M. J., Parra-Requena, G., Rodrigo-Alarcon, J., & Garcia-Villaverde, P. M. (2013). Environmental dynamism and entrepreneurial orientation: The moderating role of the firm's capabilities. *Journal of Organizational Change Management, 26*(3), 475-493.
89. Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students.* Harlow, Essex, UK: Pearson Education Limited.
90. Schumpeter, J. A. (1934). *The Theory of Economic Development.* Cambridge, MA: Havard University Press.
91. Sekaran, U., & Bougie, R. (2013). *Research Methods for Business.* Chichester, West Sussex: John Wiley & Sons Ltd.
92. Singh, A. S., & Masuku, M. B. (2014, November). Sampling Techniques & Determination of Sample Size in Applied Statistics Research: An Overview. *International Journal of Economics, Commerce and Management, II*(11), 1-22.
93. Soininen, J., Puumalainen, K., Sjogren, H., & Syrja, P. (2012). The impact of gobal economic crisis on SMEs: Does Entrepreneurial Orientation matter? *Management Research Review, 35*(10), 927-944.

94. Staniewski, M. W., Nowacki, R., & Awruk, K. (2016). Entrepreneurship and Innovativeness of Small and Medium Sized Cosntruction Enterprises. *International Entrepreneurship Management Journal , 12*, 861-877.
95. Suarez-Villa, L. (2007). Network, Innovation Capacity and the Experimentation Firm: Implications for Regional Development Policy. In M. Giaourti, & P. Nijikamp, *Spatial Interaction and Information Strategies for Emerging European Networks.*
96. Trott, P., & Hartmann, D. (2009, December). Why "Open Innovation" is Old Wine in New Bottles. *International Journal of Innovation Management, 13*(4), 715-736.
97. Ucbasaran, D., Westhead, P., Wright, M., & Flores, M. (2009, April). The nature of entrepreneurial experience, business failure and comparative optimism. *Journal of Business Venturing, 25*(2010), 541-555.
98. Voeten, J. (2015). *Enabling Innovation and Productivity Growth in Manufacturing Small and Medium Sized Enterprises in Low Income Countries.* Tilburg University.
99. Volberda, H. W., & van Bruggen, G. H. (1997). *Environmental Turbulence: A look into its dimensionality In ERIM (Electronic) Books and Chapters.* Retrieved January 18, 2019, from Erasmus Institute of Research and Management: http://hdl.handle.net/1765/6438
100. Wach, K. (2015). Entrepreneurial Orientation and Business Internationalisation Process: The Theoretical Foundations of International Entrepreneurship. *Entrepreneurial Business and Economics Review, 3*(2), 9-24.
101. Wales, W. J. (2016). Entrepreneurial Orientation: A review and synthesis of promising research directions. *International Small Business Journal, 34*(1), 3-15.
102. Wasserstein, R. L., & Lazar, N. (2016). The ASA's Statement on P-Values: Context, Process, and Purpose. *The American Statistician, 70*(2), 129-133.
103. Wijbenga, F. H., & van Witteloostuijn, A. (2007). Entrepreneurial locus of control and competitive strategies - The Monetary effect of environmental dynamism. *Journal of Economic Psychology, 28*, 566-589.
104. Wiklund, J., & Shepherd, D. (2005). Entrepreneurial Orientation and Small Business Performance: a Configurational Approach. *Journal of Business Venturing, 20*, 71-91.
105. World Bank Group. (2018). *Kenya Econpmic Update, October 2018 No.18: In Search of Fiscal Space.* Nairobi: World Bank Group.

106. Zhai, Y.-M., Sun, W.-Q., Tsai, S.-B., Wang, Z., Zhao, Y., & Chen, Q. (2018). An Empirical Study on Entrepreneurial Orientation, Absorptive Capacity, and SMEs' Innovation Performance: A Sustainable Perspective . *Sustainability, 10*(2 (314)), 1-14.

107. Zhou, K. Z. (2006). Innovation, imitation and new product performance: the case of China. *Industrial Marketing Management Journal, 35*(2), 394-402.

APPENDIX

APPENDIX I: REFERENCE CODES ON QUESTIONS ASKED

ENTREPRENEURIAL ORIENTATION	
AUTONOMY	
EOA1	Our firm supports the efforts of individuals that work autonomously
EOA2	Our firm requires individuals to rely on Senior managers to guide their work
EOA3	In general, the top managers of our firm believe that the best results occur when individuals decide for themselves what business opportunities to pursue
EOA4	In the firm the top managers of our firm believe that the best results occur when the CEO and top managers provide the primary impetus for pursuing business opportunities
EOA5	In our firm, individuals pursuing business opportunities make decisions on their own without constantly referring to their supervisor
EOA6	In our firm, individuals pursuing business opportunities are expected to obtain approvals from their supervisors before making decisions
EOA7	In our firm, the CEO and the top management team play a major role in identifying and selecting the entrepreneurial opportunities the firm pursues
EOA8	In our firm, employee initiatives and input play a major role in identifying and selecting the entrepreneurial opportunities the firm pursues.
PRO-ACTIVENESS	
EOP1	In general, the top managers of our firm have a strong tendency to be ahead of others in introducing novel ideas or products.
EOP2	In general, the top managers of our firm favour a emphasis on the marketing of tried and tested products or services
EOP3	In dealing with competitors, our firm typically initiates actions which competitors then respond to.
EOP4	Our firm typically responds to actions which competitors initiates
EOP5	In dealing with competitors, our firm is very often the first business to introduce new products/services, administrative techniques, operating technologies, etc
EOP6	Our firm is very seldom the first business to introduce new products/services, administrative techniques, operating technology etc etc
EOP7	Our company is the first to detect fundamental shifts in our industry (e.g., competition, technology, regulation).
RISK TAKING	
EORT1	Our firm has a strong tendency for lower risk projects (with normal and certain rates of return)
EORT2	Our firm has a strong proclivity for high risk projects (with chances of very high returns
EORT3	Owing to the nature of the environment, our firm finds it best to explore it gradually via timid, incremental behaviour
EORT4	Owing to the nature of the environment, bold, wide-ranging acts are necessary to achieve the firm's objectives.
EORT5	Our firm typically adopts a cautious, 'wait and see" posture in order to minimize the probability of making costly decisions.
EORT6	When confronted with decisions involving uncertainty, our firm typically adopts a bold posture in order to maximize the probability of exploiting opportunities.

COMPETITOR AGGRESSION	
EOCA1	Our firm typically adopts a very competitive "undo-the-competitors" posture
EOCA2	Our firm is very aggressive and intensely competitive.
EOCA3	Our firm typically seeks to avoid competitive clashes, preferring a "live" and "let live" posture

ENVIRONMENTAL DYNAMISM	
SOCIO-CULTURAL	
EDSC1	Our firm favours diversity in ethnic, religious and cultural backgounds and encourages sharing of diverse opinions in its business development.
EDSC2	Our firm does not consider ethnical, religious nor cultural background as being important in business development.
EDSC3	The demands and tastes of our consumers are very easy to predict and forecast.
EDSC4	The demands and tastes of our customers are very varied and are seldom easy to predict
REGULATORY FRAMEWORK	
EDRF1	Our company has little interaction with the industry regulators and legislators to understand and advocate on some of the impeding and enacted legislation and policy changes that could affect our industry.
EDRF2	Our company has frequent interaction with the industry regulators and legislators to understand and advocate for some of the impeding and enacted legislation and policy changes
LINKAGES/ALLIANCES AND PARTNERSHIPS	
EDLAP 1	The organization regularly enters into mutually beneficial networks/ alliances/ partnerships whose sole mandate is driving innovation in the industry
EDLAP 2	We collect industry information by informal means (e.g., lunch with industry friends).
EDLAP 3	The organization rarely participates in larger private firm-research driven initiatives
EDLAP 4	The organization participates in larger private firm-research driven initiatives at least once every six months (semi-annually)
EDLAP 5	The organization rarely participates in public-research driven initiatives
EDLAP 6	The organization participates in public-research driven initiatives at least once every quarter.
AVAILABLE INDUSTRY/ PRACTICES	
EDAIP1	The production/service technology is not subject to very much change and is well established
EDAIP2	The modes of production/service change often and in a major way
EDAIP3	The rate at which products/services are getting obsolete in the industry is very slow.
EDAIP4	The rate of obsolescence is very high in our industry.
EDAIP5	In our market, the volumes of products and services to be delivered change fast and often
EDAIP6	In a year, nothing has changed in our market in terms of the demand of products and services

FIRM INNOVATIVENESS	
FI1	In my firm, there exists a very strong emphasis on marketing of tried and true product/ services from the industry
FI2	In my firm, no new lines of products, services, or programs were introduced during the past three years
FI3	In my firm, changes in product lines have been minor over the last three years